GRAIN INSPECTION, PACKERS AND STOCKYARDS ADMINISTRATION

Technical Services Division January 2001

U.S. SORGHUM INSPECTION

DEFINITION OF SORGHUM

Sorghum is defined as: Grain that, before the removal of dockage, consists of 50 percent or more of whole kernels of sorghum (Sorghum bicolor (L.) Moench) excluding nongrain sorghum and not more than 10.0 percent of other grains for which standards have been established under the United States Grain Standards Act.

Whole kernels are kernels with three-fourths or more of the kernel present. Other grains for which standards have been established are barley, canola, corn, flaxseed, oats, rye, soybeans, sunflower seed, triticale, and wheat.

CLASSES

Sorghum is divided into four classes: Sorghum, Tannin sorghum, White sorghum, and Mixed sorghum. There are no subclasses in sorghum.

Sorghum. Sorghum which is low in tannin content due to the absence of a pigmented testa (subcoat) and contains less than 98.0 percent White sorghum and not more than 3.0 percent Tannin sorghum. The pericarp (outer layers of the sorghum grain fused to the seedcoat) color of this class may appear white, yellow, pink, orange, red, or bronze.

Tannin Sorghum. Sorghum which is high in tannin content due to the presence of a pigmented testa (subcoat) and contains not more than 10.0 percent non-Tannin sorghum. The pericarp color of this class is usually brown but may also be white, yellow, pink, orange, red, or bronze.

White Sorghum. Sorghum which is low in tannin content due to the absence of a pigmented testa (subcoat) and contains not more than 2.0 percent sorghum of other classes. The pericarp color of this class is white or translucent and includes sorghum containing spots that, singly or in combination, cover 25.0 percent or less of the kernel.

Mixed Sorghum. Sorghum which does not meet the requirements for any of the classes Sorghum, Tannin sorghum, or White sorghum.

Tannins generally have an anti-nutritional effect. Digestible energy and digestible protein are reduced as the tannin content is increased. Their main use is brewing, and are considered a 'last resort' food in droughts. On the positive side, tannin sorghums resist mold and insect damage as well as usually being considered bird resistant.

SPECIAL GRADES

The commercial value of grain is not always reflected in its numerical grade. Therefore, the U.S. Standards also define the following special grades in sorghum: Infested and Smutty.

Infested is sorghum that is infested with live weevils or other live insects injurious to stored grain.

Smutty sorghum has kernels that are covered with smut spores to give an overall smutty appearance, or contains 20 or more smut balls in 100 grams of sorghum.

SORGHUM GRADING STEPS

STEP 1. Examine the sample for heating, odor, animal filth, castor beans, crotalaria seeds, garlic, glass, general appearance, insect infestation, smut, stones, unknown foreign substances, and other unusual conditions.

STEP 2. Determine the moisture content.

STEP 3. Determine the test weight per bushel of the sample.

STEP 4. Determine the percentage of dockage in the sample.

STEP 5. Determine the percentage of mechanically separated Broken Kernels and Foreign Material (BNFM) in the sample.

STEP 6. Divide out representative portions from the dockage and BNFM-free sample and determine the percentage of handpicked FM, class, damaged kernels, and heat-damaged kernels.

STEP 7. When requested by applicant, obtain 10 pounds of representative sample and obtain the parts per billion (ppb) of aflatoxin.

MOISTURE. While not a grading factor, moisture is determined on all sorghum samples graded by the official inspection system. The moisture content of grain is very important to its storability and can affect end-use.

DOCKAGE. All matter other than sorghum that can be removed from the original sample by use of an approved device according to procedures prescribed in FGIS instructions. Also, underdeveloped, shriveled, and small pieces of sorghum kernels removed in properly separating the material other than sorghum.

TEST WEIGHT. The weight per Winchester bushel (2,150.42 cubic inches) as determined using an approved device according to procedures prescribed in FGIS instructions.

DAMAGE. Kernels, pieces of sorghum kernels, and other grains that are badly ground-damaged, badly weather-damaged, diseased, frost-damaged, germ-damaged, heat-damaged, insect-bored, mold-damaged, sprout-damaged, or otherwise materially damaged.

HEAT-DAMAGED KERNELS. Kernels, pieces of sorghum kernels, and other grains that are materially discolored and damaged by heat.

BROKEN KERNELS AND FOREIGN MATERIAL. Broken kernels is all matter which passes through a 5/64 triangular-hole sieve and over a 2.5/64 round-hole sieve according to procedures prescribed in FGIS instructions. Foreign material is all matter, except sorghum, which passes over the number 6 riddle and all matter other than sorghum that remains on top of the 5/64 triangular-hole sieve according to procedures prescribed in FGIS instructions.

SORGHUM GRADES AND GRADE REQUIREMENTS

Grade	Minimum test weight per bushel (pounds)	Maximum limits of--			
		Damaged kernels		Broken kernels and foreign material	
		Heat (percent)	Total (percent)	Foreign material (part of total) (percent)	Total (percent)
U.S. No. 1	**57.0**	**0.2**	**2.0**	**1.5**	**4.0**
U.S. No. 2	**55.0**	**0.5**	**5.0**	**2.5**	**7.0**
U.S. No. 3 1/	**53.0**	**1.0**	**10.0**	**3.5**	**10.0**
U.S. No. 4	**51.0**	**3.0**	**15.0**	**4.5**	**13.0**

U.S. Sample grade is sorghum that

(a) Does not meet the requirements for the grades U.S. Nos. 1, 2, 3, or 4; or

(b) Contains 8 or more stones which have an aggregate weight in excess of 0.2 percent of the sample weight, 2 or more pieces of glass, 3 or more crotalaria seeds (Crotalaria spp.), 2 or more castor beans (Ricinus communis L.), 4 or more particles of an unknown foreign substance(s) or a commonly recognized harmful or toxic foreign substance(s), 8 or more cocklebur (Xanthium spp.) or similar seeds singly or in combina tion, 10 or more rodent pellets, bird droppings, or an equivalent quantity of other animal filth in 1,000 grams of sorghum; or

(c) Has a musty, sour, or commercially objectionable foreign odor (except smut odor); or

(d) Is badly weathered, heating, or otherwise of distinctly low quality.

1/ Sorghum which is distinctly discolored shall not grade higher than U.S. No. 3.

BASIS OF DETERMINATION

Lot as a Whole	Factors Determined Before the Removal of Dockage	Factors Determined After the Removal of Dockage	Factors Determined After the Removal of Dockage, Broken Kernels, and Foreign Material Removed by the 5/64 sieve
Distinctly low quality Heating Infested Odor	Distinctly low quality General appearance Infested Kind of grain Moisture Odor Smut Test weight U.S. Sample grade factors	Broken kernels and foreign material	Class Damaged kernels Heat-damaged kernels Odor Stones

OPTIONAL INSPECTION SERVICES

Other services also available for describing the quality and characteristics of sorghum are aflatoxin and vomitoxin testing.

Processing The Work Sample